Teacher Characteristics and Student Achievement: Evidence from Teach For America*

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July 2011

Abstract

There is considerable variance in the productivity of teachers, yet educators have been unable to identify observable characteristics related to teacher effectiveness. This paper uses data from Teach for America admissions records to explore whether information collected at the time of hire can predict student outcomes. We find that a teacher's academic achievement, leadership experience, and perseverance are associated with student gains in math. Leadership experience and commitment to the TFA mission are associated with gains in English. The TFA admissions measures are also associated with improved classroom behavior. These results suggest that teacher success can be predicted at the time of hire.

*PRELIMINARY AND INCOMPLETE. We are grateful to Cynthia Cho, Heather Harding, Brett Hembree, Wendy Kopp, Cecilia Mo, Ted Quinn, Cynthia Skinner, Andy Sokatch, and Sean Waldheim for their assistance in collecting the data necessary for this project. We also thank Sarah Cohodes, Susan Dynarski, Roland Fryer, Brian Jacob, Lawrence Katz, and Crystal Yang for helpful comments and suggestions. Financial support from the Multidisciplinary Program on Inequality and Social Policy is gratefully acknowledged. Correspondence can be addressed to the author by e-mail: dobbie@fas.harvard.edu

1 Introduction

There is considerable variance in the productivity of teachers. A one standard deviation increase in teacher quality is associated with a 0.1 to 0.2 standard deviation increase in student achievement (Rockoff, 2004; Rivkin, Hanuskek, and Kain, 2005; Aaronson, Barrow, and Sander, 2007; Kane and Staiger, 2008). If observable characteristics that predict teacher quality can be determined, they could be used to identify the most effective candidates in the hiring process. If teacher characteristics are malleable, determining which teacher characteristics have the greatest impact on student achievement could also inform the design of teacher training programs.

Despite the importance of identifying observable characteristics that predict teacher success, researchers and educators have had difficulty identifying specific characteristics related to teacher effectiveness (Hanushek, 1986; 1997). There is little evidence that academic background (e.g. Clotfelter et al., 2006; 2007; Harris and Sass, 2006), college admissions scores (e.g. Ferguson and Ladd, 1996), certification exam scores (e.g. Boyd et al., 2006; 2008a; 2008b; Clotfelter et al., 2006; 2007; Goldhaber, 2007; Harris and Sass, 2006), or personality characteristics (e.g. Woolfolk and Hoy, 1990; Raudenbush et al., 1992; Hoy and Woolfolk, 1993) can predict student success. The lack of evidence linking observable characteristics to teacher effectiveness is due, in part, to the fact that most research on teacher effectiveness has examined a relatively small set of teacher characteristics collected by school administrators, such as graduate education and certification. Recent research using data not typically collected by school districts suggests that we may be able to predict teacher effectiveness. Rockoff, Jacob, Kane, and Staiger (2011) find that students assigned to a teacher with higher cognitive or non-cognitive skills score about 0.03 standard deviations higher in math. Rockoff and Speroni (forthcoming) also find that students assigned to more highly ranked New York City Teaching Fellows score about 0.015 standard deviations higher in math.

This paper explores whether information used to select Teach For America (TFA) corps members

can predict teachers' future impacts on student achievement. TFA is a non-profit organization that recruits recent college graduates to teach for two years in low-income communities. Applicants complete an online application, which includes a letter of intent, and a resume. After a phone interview, the most promising applicants are invited to participate in an in-person interview, which includes a sample teaching lesson, a group discussion, a written exercise, and a personal interview. Applicants who are invited to interview are also required to provide transcripts, obtain two recommendations, and provide one additional reference. Using information collected through the application and interview, TFA bases their selection of candidates on a model that accounts for multiple criteria that they believe are linked to success in the classroom, including academic achievement, leadership experience, perseverance, critical thinking, organizational ability, motivational ability, respect for others, and commitment to the TFA mission. We connect the TFA data to administrative data on student outcomes in New York City to analyze the impact of the TFA measures on student achievement.

Our empirical analysis suggests that several of the TFA measures are associated with student gains in math in a teacher's first year. A one standard deviation increase in an index that combines all eight of the TFA measures is associated with a 0.150 standard deviation increase in math scores. The gains are driven by differences in academic achievement, leadership, and perseverance. Students assigned to a teacher with a one standard deviation higher academic achievement score gain 0.043 standard deviations higher in math. Students assigned to teachers with a one standard deviation higher rating in leadership experience and perseverance score 0.054 and 0.040 standard deviations higher, respectively. Leadership and fit are related to student gains in English, but the imprecision of our estimates makes definitive conclusions difficult. Critical thinking ability, organizational ability, motivational ability, and respect for others are not significantly related to achievement in either subject, though we can not rule out modest impacts. The TFA measures are also marginally

associated with fewer behavioral infractions.

The paper proceeds as follows. Section 2 provides a brief overview of Teach For America. Section 3 discusses the data we use in our analysis. Section 4 details our research design and presents our results. Section 5 concludes.

2 A Brief Overview of Teach For America

2.1 History

Teach For America (TFA) is a non-profit organization that recruits recent college graduates to teach for two years in low-income communities. Based on founder Wendy Kopp's undergraduate thesis at Princeton University, TFA was created to build a movement to eliminate educational inequity by enlisting our nation's most promising future leaders. In 1990, TFA's first year in operation, Kopp raised $2.5 million and attracted 2,500 applicants for 500 teaching slots in New York, North Carolina, Louisiana, Georgia, and Los Angeles.

Since its founding, TFA corps members have taught more than three million students. Today, there are 8,200 TFA corps members in 125 "high-need" districts across the country, including 13 of the 20 districts with the lowest graduation rates. Roughly 80 percent of the students reached by TFA qualify for free or reduced-price lunch and more than 90 percent are black or Hispanic.

2.2 Training and Placement

Once recruits are accepted into the program, they take part in a five-week TFA summer institute to prepare them for placement in the classroom at the end of the summer. The TFA summer institute includes courses covering teaching practice, classroom management, diversity, learning theory, literacy development, and leadership. During the institute, groups of participants also take full teaching responsibility for a class of summer school students.

At the time of their interview, applicants submit their subject, grade, and location preferences. TFA works to balance these preferences with the needs and requirements of districts. With respect to location, applicants rank each TFA region as highly preferred, preferred, or less preferred and indicate any special considerations, such as the need to coordinate with a spouse. Over 90 percent of the TFA applicants accepted are matched to one of their "highly preferred" regions (Decker et al., 2006).

TFA also attempts to match applicants to preferred grade levels and subjects, depending on applicants' academic backgrounds, district needs, and state and district certification requirements. As requirements vary from region to region, applicants may not be qualified to teach the same subjects and grade levels in all regions. It is also difficult for school regions to predict the exact openings they will have in the fall, and late changes in subject or grade-level assignments are not uncommon.

TFA corps members are employed and paid directly by the school districts for which they work, and generally receive the same salaries and health benefits as other first year teachers. Most districts pay a $1,500 per corps member fee to TFA to offset screening and recruiting costs. TFA gives corps members various additional financial benefits, including "education awards" of $4,725 for each year of service, which they can use toward past or future educational expenses, and transitional grants and no-interest loans to help corps members make it to their first paycheck.

TFA corps members are hired to teach in local school districts through alternative routes to certification. Typically, they must take and pass exams required by their districts before they begin teaching. Corps members may also be required to take additional courses to meet state certification requirements or to comply with the requirements for highly qualified teachers under the No Child Left Behind Act.

2.3 Admissions Process

Entry into TFA is highly competitive; in 2010, more than 46,000 individuals applied for just over 4,000 spots. At Ivy League universities, 12 percent of all seniors applied. A significant number of seniors from historically black colleges and universities applied, including 1 in 5 at Spelman College and 1 in 10 at Morehouse College. Twenty-eight percent of incoming corps members received Pell Grants, and almost one-third are people of color.

In its recruitment efforts, TFA focuses on individuals who possess strong academic records and leadership capabilities, regardless of whether or not they have had exposure to teaching practice prior to entry into TFA. Despite often lacking formal training, students assigned to TFA corps members score about 0.15 standard deviations higher in math and 0.04 standard deviations higher in reading than students assigned to traditionally certified teachers (Decker et al., 2006).[1]

To apply, candidates complete an online application, which includes a letter of intent, and a resume. After a phone interview, the most promising applicants are invited to participate in an in-person interview, which includes a sample teaching lesson, a group discussion, a written exercise, and a personal interview. Candidates who receive an in-person interview complete a sample teaching lesson, participate in a group discussion, and have a one-on-one interview. Applicants who are invited to interview are also required to provide transcripts, obtain two on-line recommendations, and provide one additional reference. Using information collected through the application and interview, TFA bases their selection of candidates on a model that accounts for multiple criteria that they believe are linked to success in the classroom, including achievement, leadership experience, perseverance, critical thinking, organizational ability, motivational ability, respect for others, and commitment to the TFA mission. TFA conducts ongoing research on their selection criteria, focusing on the link between the selection criteria and observed single-year gains in student achievement in

[1] Nonexperimental evaluations of Teach For America include Kane, Rockoff, and Staiger (2006) and Xu, Hannaway and Taylor (2011).

TFA classrooms. As a result, the exact measurement of each criteria changes somewhat from year to year.

Academic achievement measures whether an applicant has achieved ambitious, measurable results in academics. TFA's leadership measure evaluates whether the candidate's experience and performance leading others in extracurricular activities or jobs. Perseverance attempts to identify applicants who, when challenged, work through obstacles purposefully and relentlessly. Critical thinking measures an applicant's ability to make accurate connections between cause and effect and generate relevant solutions to problems. TFA's organization variable captures an individual's ability to plan well and to manage responsibilities effectively. Motivational ability measures the applicant's skill using interpersonal skills to motivate and lead others. Whether an applicant holds high expectations for individuals in low-income communities is captured by the respect measure. The last TFA measure is fit, which measures the candidate's understanding of and commitment to TFA's vision.

Table 1 examines the pairwise correlation between TFA admissions measures. Perhaps surprisingly, the TFA measures are only modestly correlated with each other. Achievement and leadership have a pairwise correlation of -0.160, while respect and fit have a pairwise correlation of 0.257. No other correlations exceed 0.100. This suggests that each measure captures different information about a corps member.

3 Data and Sample

3.1 Administrative Data

To test the impact of teacher characteristics at the time of application on student achievement, we merge administrative data on student outcomes from the New York City Department of Education

with admissions records from Teach For America.

The NYCDOE data include information on each student's race, gender, free and reduced-price lunch eligibility, classroom assignment, attendance, behavior, and state math and English test scores for students in grades three through eight. The data also includes administrative payroll records that provide information on each teacher's gender, ethnicity, date of hire, and certification. These data are available for the 2004 - 2005 through 2009 - 2010 school years. The payroll records only include traditional public schools. As a result, we do not have information on TFA teachers assigned to charter schools in the city.

We match the NYCDOE data to admissions data from TFA using teacher name and first year. We drop teachers who share a name and first year to avoid false matches. Within the sample of teachers with unique names and first years, we are able to match 90.6 percent of NYCDOE teachers certified through TFA, and 60.3 percent of TFA corps members assigned to New York City. The match rate for TFA corps members assigned to New York City is lower because of the assignment of TFA teachers to charter schools not in our data.

The TFA data consist of admissions files and placement information for the 2007 through 2009 application cohorts.[2] A typical applicant's data include her name, undergraduate institution, GPA, and major, admissions decision, placement information, and measures of achievement, perseverance, critical thinking, organizational ability, motivational ability, respect for others, and commitment to the TFA mission. We standardize each measure to have a mean of zero and a standard deviation of one in each application cohort. We also pool information across the TFA measures by taking the average of the eight measures standardized measures.

Our final sample consists of students in third through eighth grade assigned to a first year TFA teacher. These restrictions leave us with a sample of 384 TFA teachers, 279 of whom teach math,

[2]Older cohorts were evaluated using different metrics that are not comparable to the more recent cohorts.

and 310 who teach English. Restricting the sample to students in fourth through eighth grade with baseline test scores leaves the results essentially unchanged.

Summary statistics for our final sample are displayed in Table 2. 16.9 percent of TFA teachers in our sample are black or Hispanic, compared to 28.8 percent of first year teachers and 36.5 percent of all third through eighth grade teachers in New York City. The typical classroom of the TFA teacher is 32.7 percent black and 62.8 percent Hispanic, with 95.6 percent of students eligible for free or reduced price lunch. Students in TFA classrooms also enter with lower baseline scores in math and English.

4 Empirical Framework and Results

4.1 Student Achievement

We are interested in the impact of teacher characteristics on student achievement. We model student achievement as a function of student and teacher characteristics:

$$A_{ijt} = \alpha_t + \gamma_g + \beta X_i + \delta T_j + \varepsilon_{ijt} \tag{1}$$

Where A_{ijt} is the achievement test score for student i with teacher j in year t, α_t is a year effect, γ_g is a grade effect, and X_i is a vector of student level controls including gender, race, eligibility for free or reduced price lunch, and previous test scores. T_j is a vector of teacher characteristics including gender, race, and measures of a teacher's achievement, perseverance, critical thinking ability, organizational ability, motivational ability, respect for others, and commitment to the TFA mission. ε_{ijt} is an error term that captures random variation in test scores.

The parameter of interest is δ, which measures the impact of teacher characteristics on student achievement. The key threat to our interpretation of OLS estimates of equation (1) is that students

sort into classrooms based on teacher characteristics. In particular, one may be concerned that more skilled students are paired with more effective teachers. This kind of nonrandom sorting could invalidate our design by creating unobserved differences in student characteristics that are correlated with teacher effectiveness. We evaluate this possibility by regressing whether or not a student is black, Hispanic, eligible for free or reduced price lunch, and previous math and English scores on the TFA measures. We further control for year effects, grade effects, and student level controls. Appendix Table 1 presents the results of this test. Students assigned to TFA teachers with a higher index of predicted effectiveness are somewhat less likely to be black, but there are no other statistically significant differences. Examining each TFA measure separately, none of the 40 point estimates are significant at the ten percent level. Given the lack of a clear pattern and general lack of statistical significance of the point estimates, we interpret the results from Appendix Table 1 as showing no clear evidence that our identifying assumption is violated.

Table 3 presents our main results from equation (1) for a TFA teacher's first year. Columns 1 and 2 present our results for math, while columns 3 and 4 present our results for English. We normalize student test scores at the year by grade level, and pool outcomes from the 2007 - 2008 to 2009 - 2010 school years. All regressions control for year and grade effects, teacher gender and ethnicity, and student gender, ethnicity, free and reduced price lunch eligibility, and baseline test scores. Standard errors are clustered at the teacher level.

The TFA measures predict economically and statistically significant variation in student gains in math. A one standard deviation increase in the TFA index measure of predicted effectiveness is associated with a 0.150 standard deviation gain in math test scores. Column 2 considers the individual impact of each TFA measure on math scores. Academic achievement, leadership, and perseverance drive the index results from Column 1. Students assigned to a teacher with a one standard deviation higher achievement score 0.043 standard deviations higher in math. Students

assigned to a teacher with higher measures of leadership score 0.054 standard deviations higher in math, and students assigned to a teacher with higher perseverance score 0.040 standard deviations higher. Critical thinking, organizational ability, motivational ability, respect for others, and commitment to the TFA mission are not significantly related to math achievement.

Columns 3 and 4 present our results for English. The TFA index measure is positively associated with student gains in English, but is not statistically significant. Leadership and fit are marginally related to English gains, but only at the 10 percent level. The relative imprecision of the English results may be, in part, because the variance in teacher effectiveness for English is considerably smaller than math (Kane et al., 2008; Kane and Staiger, 2008), making it more difficult to identify proportionally similar effects.

To put the magnitude of our estimates in context, the effect of teacher experience is about 0.06 standard deviations in the first year and 0.02 in the second (Rivkin, Hanushek, and Kain, 2005; Clotfelter, Ladd, and Vigdor, 2006; Harris and Sass, 2006; Jacob, 2007). The effect of lowering class size from 24 to 16 students per teacher is approximately 0.22 standard deviations on combined math and reading scores (Krueger, 1999). The effect of attending a high-quality charter school is between 0.09 and 0.40 standard deviations a year in math and 0.05 to 0.10 standard deviations year in English (Hoxby and Muraka, 2010; Abdulkadiroglu et al., forthcoming; Dobbie and Fryer, forthcoming). All of these interventions are likely to cost significantly more than a system of improved teacher screening.

Table 4 investigates heterogeneous effects across gender and baseline test score. We estimate equation (1) allowing the effect of the TFA index measure to vary by group. The impact of being assigned to a teacher with higher measured effectiveness is the same for males and females, and for students with baseline scores above and below the mean.

Table 5 estimates the impact of each TFA measure on absences and behavior, two alternative

measures of academic success. We standardize attendance to be the number of days present over the number of total days in the schoolyear. Behavior is a dichotomous variable equal to one if the student had any behavioral incidents during the school year. We limit the sample to students in grades three through five, as middle school students interact with multiple teachers during the day. The TFA measures are also predictive of improved attendance and decreased incidence of behavioral outcomes. Students assigned to a teacher with a one standard deviation higher index measure of predictive effectiveness are 4.7 percentage points (58.75 percent) less likely to have a behavioral incident during the school year. The impact on behavioral outcomes is driven by respect. A one standard deviation increase in a teacher's respect score is associated with a 3.1 percentage point decrease in probability of having a behavioral infraction. A one standard deviation increase in critical thinking score is associated with a 1.5 percentage point decrease in the probability of a behavioral infraction, though the estimate is only significant at the 10 percent level. While the index measure of predicted effectiveness is not significantly associated with attendance rate, students assigned to a teacher with a one standard deviation higher fit score also attend 0.4 percentage points more days of school compared to other NYC students.

Appendix Table 2 presents results for a TFA teacher's second year. Following our results from Table 3, achievement, leadership, and perseverance are positively associated with math achievement. The estimates are imprecisely measured, however, and not statistically different than zero. The TFA index is now positively related to English scores, but none of the individual measures are statistically significant.

5 Conclusion

This paper has shown that information available at the time of hire can predict significant variation in teacher effectiveness. A teacher's prior academic achievement, leadership, and perseverance

are associated with student gains in math in a teacher's first year, and leadership experience and commitment to the TFA mission are associated with student gains in English. The TFA measures are also associated with a decrease in behavioral problems.

Our results have enormous implications for school districts. An ex-post strategy of retaining the top 20 percent of new teachers based on test score value added would yield annual gains in academic achievement of 0.08 standard deviations (Staiger and Rockoff, 2010). The results presented in this paper suggest that a strategy of ex-ante screening using TFA admissions measures would have a larger impact while being far more practical to implement. An improved teacher selection system is also likely to be far less expensive than non-teacher based interventions with a similar impact, from reducing class size to developing a network of charter schools.

With that said, the general equilibrium effect of improved teacher selection is as of yet unknown. Improved selection is only beneficial to the extent that there exist effective teachers who are unhired.

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Table 1
Pairwise Correlation of TFA Measures

	Achievement	Leadership	Perseverance	Critical	Organization	Motivate	Respect	Fit
Achievement	1.000							
Leadership	-0.160	1.000						
Perseverance	-0.071	0.092	1.000					
Critical	0.055	0.022	-0.003	1.000				
Organization	0.072	-0.052	0.032	-0.035	1.000			
Motivate	0.003	0.066	0.003	-0.024	0.094	1.000		
Respect	-0.040	-0.037	0.002	-0.011	0.034	0.085	1.000	
Fit	-0.071	-0.060	0.052	-0.033	0.093	0.026	0.257	1.000

This table reports the correlation between each TFA measure. The sample is TFA corps members in New York City who started teaching between 2007 and 2009.

Table 2
New York City Summary Statistics

Teacher Characteristics	TFA	1st Year	All
Male	0.266	0.218	0.183
Black	0.090	0.165	0.235
Hispanic	0.079	0.123	0.131
TFA Index	0.070	–	–
Achievement	0.075	–	–
Leadership	0.042	–	–
Perseverance	-0.025	–	–
Critical	0.021	–	–
Organization	0.014	–	–
Motivate	-0.017	–	–
Respect	0.373	–	–
Fit	0.057	–	–
Classroom Characteristics			
Male	0.533	0.550	0.535
White	0.019	0.085	0.124
Black	0.327	0.338	0.329
Hispanic	0.628	0.490	0.419
Free or Reduced Price Lunch	0.956	0.906	0.884
Previous Math Score	-0.729	-0.562	-0.296
Previous Reading/ELA Score	-0.633	-0.552	-0.320
Teachers	379	3674	51203

This table reports summary statistics. The sample is 3rd to 8th grade math and English teachers in New York City from the 2007 - 2008 to 2009 - 2010 school years.

Table 3
Student Achievement

	Math		ELA	
TFA Index	0.150***	–	0.039	–
	(0.054)		(0.039)	
Achievement	–	0.043**	–	0.002
		(0.019)		(0.017)
Leadership	–	0.054**	–	0.027*
		(0.023)		(0.016)
Perseverance	–	0.040**	–	−0.004
		(0.021)		(0.015)
Critical	–	0.001	–	0.014
		(0.023)		(0.015)
Organization	–	−0.008	–	−0.017
		(0.022)		(0.016)
Motivate	–	0.013	–	−0.007
		(0.019)		(0.019)
Respect	–	0.013	–	−0.001
		(0.022)		(0.018)
Fit	–	0.004	–	0.029*
		(0.022)		(0.016)
Teachers	267	267	303	303
Students	6084	6084	6761	6761

This table reports OLS estimates. The sample is 3rd through 8th grade students in a math or ELA class with a first year TFA teacher between 2007 - 2008 and 2009 - 2010. All regressions control for year and grade effects, teacher gender and ethnicity, and student gender, ethnicity, free lunch status and previous test scores. Standard errors are clustered at the teacher level. *** = significant at 1 percent level, ** = significant at 5 percent level, * = significant at 10 percent level.

Table 4
Student Achievement by Subsample

	Male	Female	p-value	High Baseline	Low Baseline	p-value
Math	0.182***	0.116*	0.143	0.189**	0.083	0.117
	(0.053)	(0.064)		(0.082)	(0.054)	
English	0.018	0.060	0.288	0.054	0.005	0.411
	(0.044)	(0.045)		(0.055)	(0.039)	

This table reports OLS estimates on the TFA index measure of predicted effectiveness by group. The sample is 3rd through 8th grade students in a math or ELA class with a first year TFA teacher between 2007 - 2008 and 2009 - 2010. All regressions control for year and grade effects, teacher gender and ethnicity, and student gender, ethnicity, free lunch status and previous test scores. Standard errors are clustered at the teacher level. *** = significant at 1 percent level, ** = significant at 5 percent level, * = significant at 10 percent level.

Table 5
Other Academic Outcomes

	Absences		Behavior	
TFA Index	0.002	–	−0.047*	–
	(0.005)		(0.026)	
Achievement	–	0.000	–	0.003
		(0.002)		(0.013)
Leadership	–	0.003	–	0.001
		(0.002)		(0.011)
Perseverance	–	0.001	–	0.000
		(0.002)		(0.010)
Critical	–	0.002	–	−0.015*
		(0.002)		(0.009)
Organization	–	−0.002	–	0.006
		(0.002)		(0.008)
Motivate	–	−0.003	–	−0.013
		(0.002)		(0.008)
Respect	–	−0.002	–	−0.031**
		(0.003)		(0.014)
Fit	–	0.004**	–	−0.017
		(0.002)		(0.013)
Teachers	99	99	114	114
Students	1859	1859	1949	1949

This table reports OLS estimates. The sample is 3rd through 5th grade students in a math or ELA class with a first year TFA teacher between 2007 - 2008 and 2009 - 2010. The dependent variable for columns 1 and 2 is attendance rate, defined as the number of days present over the possible number of days present. The dependent variable for columns 3 and 4 is an indicator variable for whether a student had at least one behavioral infraction during the school year. All regressions control for year and grade effects, teacher gender and ethnicity, and student gender, ethnicity, free lunch status and previous outcomes. Standard errors are clustered at the teacher level. *** = significant at 1 percent level, ** = significant at 5 percent level, * = significant at 10 percent level.

Appendix Table 1
Baseline Characteristics

	Black		Hispanic		Lunch		Math		English	
TFA Index	−0.087*		0.072		−0.007		0.049		0.111	
	(0.050)		(0.048)		(0.008)		(0.096)		(0.086)	
Achievement		−0.000		−0.007		−0.001		0.053		0.026
		(0.022)		(0.021)		(0.004)		(0.038)		(0.036)
Leadership		−0.020		0.012		0.002		0.026		0.030
		(0.018)		(0.018)		(0.004)		(0.043)		(0.034)
Perseverance		−0.001		0.007		−0.001		−0.007		0.024
		(0.022)		(0.022)		(0.004)		(0.040)		(0.035)
Critical		−0.005		0.008		−0.002		0.008		−0.000
		(0.019)		(0.018)		(0.004)		(0.047)		(0.037)
Organization		−0.032*		0.028		0.002		−0.032		−0.021
		(0.019)		(0.019)		(0.004)		(0.044)		(0.035)
Motivate		−0.004		0.002		−0.001		0.019		0.025
		(0.022)		(0.021)		(0.005)		(0.036)		(0.045)
Fit		−0.022		0.017		−0.003		−0.008		0.002
		(0.022)		(0.023)		(0.004)		(0.044)		(0.033)
Teachers	267	267	267	267	263	263	236	236	269	269
Students	6963	6963	6963	6963	5906	5906	5129	5129	5766	5766

This table reports OLS estimates for predetermined student characteristics. The sample is 3rd through 8th grade students in a math or English class with a TFA teacher. All regressions control for teacher gender, teacher ethnicity, cohort, and all student controls except the dependent variable. Standard errors are clustered at the teacher level. *** = significant at 1 percent level, ** = significant at 5 percent level, * = significant at 10 percent level.

Appendix Table 2
Student Achievement in Second Year of Teaching

	Math		English	
TFA Index	0.036	–	0.087**	–
	(0.050)		(0.041)	
Achievement	–	0.027	–	0.028
		(0.020)		(0.018)
Leadership	–	0.007	–	0.004
		(0.020)		(0.015)
Perseverance	–	0.009	–	−0.002
		(0.020)		(0.015)
Critical	–	0.013	–	−0.000
		(0.019)		(0.015)
Organization	–	−0.000	–	0.013
		(0.020)		(0.018)
Motivate	–	0.008	–	0.026
		(0.020)		(0.017)
Respect	–	−0.009	–	0.027
		(0.026)		(0.018)
Fit	–	−0.005	–	−0.002
		(0.020)		(0.014)
Teachers	279	279	310	310
Students	6347	6347	6860	6860

This table reports OLS estimates. The sample is 3rd through 8th grade students in a math or ELA class with a second year TFA teacher between 2007 - 2008 and 2009 - 2010. All regressions control for year and grade effects, teacher gender and ethnicity, and student gender, ethnicity, free lunch status and previous test scores. Standard errors are clustered at the teacher level. *** = significant at 1 percent level, ** = significant at 5 percent level, * = significant at 10 percent level.